

We claim:

1. A process for preparing lactones by catalytic carbonylation of oxiranes using a catalyst system comprising

a) at least one carbonylation catalyst A comprising uncharged or anionic transition metal complexes of metals of groups 5 to 11 of the Periodic Table of the Elements and

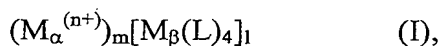
b) at least one chiral Lewis acid B,

with the exception of $[(\text{salph})\text{Al}(\text{THF})_2][\text{Co}(\text{CO})_4]$, as catalyst.

2. A process as claimed in claim 1, wherein the lactones are mixtures of S- and R-lactones having an excess of one enantiomer.

3. A process as claimed in claim 1 or 2, wherein the ligands in the carbonylation catalyst A are uncharged ligands.

4. A process as claimed in any of claims 1 to 3, wherein the carbonylation catalyst A used comprises transition metal complexes of the formula (I)



where

M_β is a transition metal of groups 8 to 10 of the Periodic Table of the Elements bearing the formal charge -1,

L is PR_3 , $\text{P}(\text{OR})_3$, NR_3 , SR_2 , OR_2 , CO, R-CN, R-NO₂, $(\text{RO})(\text{R}'\text{O})\text{C}=\text{O}$, $(\text{R})(\text{R}')\text{C}=\text{O}$, $(\text{R})\text{C}=\text{O}(\text{OR}')$,

M_α is a metal of group 1 or 2 of the Periodic Table of the Elements, Zn or Hg, bis(triarylphosphine)iminium, trityl or $\text{T}(\text{R})_4$ where

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T is N, P or As,

R, R' are each, independently of one another, H, alkyl, aryl, alkaryl or aralkyl,

n, m are each 1 or 2 and

l is $n \times m$.

- 10 5. A process as claimed in any of claims 1 to 4, wherein the transition metals present in the carbonylation catalyst A are Re, Co, Ru, Rh, Fe, Ni, Mn, Mo, W or mixtures thereof.
- 15 6. A process as claimed in claim 5, wherein Co is present as transition metal in the carbonylation catalyst A.
- 20 7. A process as claimed in any of claims 1 to 6, wherein the chiral Lewis acid B comprises compounds of metals of groups 2 to 13 of the Periodic Table of the Elements which are present in coordinatively unsaturated form under the reaction conditions.
8. A catalyst as defined in any of claims 1 and 3 to 7, with the exception of $[(\text{salph})\text{Al}(\text{THF})_2][\text{Co}(\text{CO})_4]$.
- 25 9. A process for preparing catalysts as claimed in claim 8 by mixing the components A and B.
10. The use of a catalyst as claimed in claim 8 in carbonylation reactions.